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DECEMBER 6.

The President, GENERAL ISAAC J. WISTAR, in the chair.

Fifty-eight persons present.

Papers under the following titles were presented for publication :—

“Notes on *Monarda fistulosa*.” By Thomas Meehan.

“The Phenomenon of Fertilization in the Flowers of *Monarda fistulosa*.” By Ida A. Keller.

The supposed South Chester Valley Hill Fault.—MR. THEO. D. RAND remarked that in the Final Report of the Second Geological Survey of Pennsylvania, p. 174, the following occurs: “In Montgomery County the North Valley Hill belt of quartzite undoubtedly continues beneath the Schuylkill, on the same nearly east course, nearly to the Bucks County line . . . runs on six miles into Moreland township. Here it ends, spooning to a point, and then sweeping round the east spoon point of the lime-stone . . . it returns westward as the south border of the limestone to the Schuylkill, at Conshohocken;” and on the same page in a foot note:

“Here the South Valley Hill begins and runs west into Lancaster County. We should, of course, suppose that this southern barrier of the synclinal limestone valley would be made by the quartzite. But it is made of hydromica slate. Repeated reports have been made during the last fifty years of the discovery of the quartzite (‘Potsdam sandstone’) at various points along the South Valley Hill; and no doubt specimens of quartzite have been picked up, and even thin outcrops of thin quartzite beds among the slates have been seen. But these amount to nothing. They cannot be accepted as expressing with any certainty the reappearance of the North Valley Hill belt on the South Valley Hill side of the limestone. It looks as if the North Valley Hill rocks descend against a great fault, running along the foot of the South Valley Hill, and are there entirely cut off by it, probably thrown by it (in company with the lower limestone beds,) high into the air on the Delaware side of the fault.

“Now it is just at Conshohocken that the Schuylkill River breaks out of the Chester County Limestone Valley to find its way to the sea, viz., in the short interval between the east end of the hydromica belt of the South Valley Hill coming from the west, and the west end of the southern quartzite outcrop coming from the east. What does this mean? Surely it is an added proof of a great fault; and of the total difference of the two formations; and of the futility of all endeavors to discover a southerly synclinal rise of the quartzite along the South Valley Hill.”

If for Conshohocken in the text, Spring Mill, a mile and a half below Conshohocken, be read, the facts stated agree with these observations, but with the statements in the foot note these observations do not at all accord.

1, The South Valley Hill does not end at Conshohocken; on the contrary it extends eastward nearly three miles, as correctly represented on Mr. Hall's map in Report, Vol. C^o and apparently ends in a spoon above the limestone, as in turn does the latter above the Cambrian sandstone and the Cambrian above the Laurentian. This is about a half mile nearly north of Marble Hall; the exposures are many and clear, and the ending is in a very conspicuous hill which commands an extended view westward.

2, The southern quartzite does not end at the Schuylkill. As this has been repeatedly stated in the reports of the survey, and as in this last report, the non-existence of the Cambrian south of the limestone, west of the Schuylkill, is reiterated, in spite of proof heretofore adduced before the Geological and Mineralogical Section of the Academy, he would ask attention to the specimens on the table, from various localities within the area in which the Cambrian sandstone is recognized, and also from the "thin outcrops" which "amount to nothing" along a line, the direct lineal continuation of the Barren Hill-Spring Mill outcrops, and at distances from the Schuylkill of respectively:—Gulf $1\frac{1}{2}$; County Line 2; Stackers $2\frac{1}{2}$; Hare's $2\frac{3}{4}$; Fenimore's $3\frac{1}{2}$; Wayne 4 miles southwest of the river.

This line is directly south of a line of limestone outcrops, precisely as is that east of the Schuylkill.

It is true that the exposures are scattered and the stratum narrow, but, except the specimen from northwest of West Chester, there can be no doubt that the rock is in place, and as to its absolute identity, no one who examines the specimens can be in doubt. That the belt is narrowing westwardly is shown by a comparison of the Barren Hill with the Spring Mill outcrop, besides which he believed that the schists of Cream Valley belong to the same horizon, resembling as they do those occurring between the Cambrian sandstone of the North Valley Hill and the limestone of the Chester Valley. These schists are colored on Dr. Frazer's map in C⁴ as azoic schists, etc., the same color is given the Laurentian north of the Cambrian, though he could not believe that this was Dr. Frazer's intention. In one of the areas thus colored, the great quarries northwest of Pomeroy have been opened, whence much stone has been obtained for recent work in Philadelphia by the Pennsylvania Railroad. This rock is the typical Cambrian sandstone of the region. There were specimens of it and of the schists on the table.

The limestone referred to as flanking the Cambrian west of the Schuylkill, and on its north side, occupies the floor of the narrow valley, locally known as Cream Valley, deep, with steep slopes near

the Schuylkill, but, from the rising of its floor, almost obliterated beyond Wayne. The limestone is narrow and rarely visible west of West Conshohocken, but at points distant respectively as follows: Gulf $1\frac{1}{2}$; Stacker's $2\frac{1}{2}$; and Pechin's 3 miles from the Schuylkill it appears in place, beyond which occasional sink-holes indicate its underlying. Northwest of West Chester it once more appears accompanied by the same schists as form much of the floor of Cream Valley, and which can be followed the whole distance.

Beyond this, and in almost the same line outcrops are numerous, accompanied by the same rocks until we reach the great outcrops near Doe Run in middle Chester Co., where, again, the existence of the Cambrian south of the limestone is universally admitted.

He could not, therefore, admit the futility of all endeavors to discover a southerly synclinal rise of the quartzite along the South Valley Hill, but would submit that if in a lineal distance of about thirty miles, section lines be drawn a mile apart, and more than one-half of these show an orderly succession from the outside to the center, while the others show in part the same with the remainder concealed by surface soil, the evidence of a simple synclinal is incontrovertible. It is only by the assumption that rocks, which anyone who seeks may find, do not exist, that the necessity of a fault becomes apparent. It is true that the sandy mica schists, at times garnetiferous, present a difficulty, but if these be divorced from the South Valley Hill hydromica schists with which they have no connection, and be regarded as a part of the Cambrian, and the Limestone, also Cambrian, as Walcott's recent discoveries seem to indicate, the objection vanishes. It is certainly true that in Chester County the limestones are both underlaid and overlaid with schists and gneisses, among which, close to, but not in contact with the limestone, so far as he had seen, occurs at numerous localities the characteristic Cambrian Sandstone with its micaceous parting, its rhomboidal jointing and its minute and usually disjointed tourmalines. One of the most remarkable facts is the wonderful uniformity of this rock from numerous and widely scattered outcrops over an area of more than fifty miles in length, and ten miles in greatest breadth. Indeed so exactly alike is the rock that it is impossible to determine the locality by inspection of the specimens. The specimens shown to-night verify this.

DECEMBER 13.

The President, GENERAL ISAAC J. WISTAR, in the chair.

Thirty-one persons present.

A paper entitled "The Principle of the Conservation of Energy in Biological Evolution, a Reclamation and Critique," by John A. Ryder, was presented for publication.